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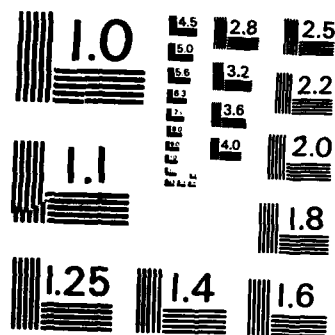
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STUDENT REPORT

WARRANTIES AND ACQUISITION STRATEGIES

MAJOR THOMAS B. MILLER

86-1755

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TITLE WARRANTIES AND ACQUISITION STRATEGIES

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SPONSOR AIR FORCE BUSINESS RESEARCH MANAGEMENT CENTER
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<p>Warranties are a requirement in system acquisition contracts as a result of the 1984 Department of Defense Appropriations Act. Since a warranty becomes effective after the system has been delivered, a program manager may be tempted to concentrate on the elements of an acquisition strategy which lead to delivery, those which he has direct control over. This paper views a warranty as somewhat like a bridge in that a warranty extends the contractor's risks into the operational world. In this context, it becomes clear that the program manager must be vitally concerned with the warranty and with integrating it into the program. The paper is the result of the author's experience and research on this complex topic. He provides a conceptual definition of a system warranty and the various levels of such an agreement. The paper also discusses risk considerations in structuring warranties and how program participants could benefit from this approach.</p> <p>(Keywords: WARRANTIES)</p>					
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PREFACE

Warranties have become a requirement in system acquisition contracts as a result of the 1984 Department of Defense Appropriations Act (Public Law 98-212). Since the warranty becomes effective after the system has been delivered, a program manager may be tempted to concentrate on the elements of an acquisition strategy which lead to delivery, those which he has direct control over. This paper views a warranty as somewhat like a bridge in that a warranty extends the contractor's risks into the operational world beyond development. In this context, it becomes clear that the program manager must be vitally concerned with the warranty and with integrating it into the program. The paper is the result of the author's experience and research on this complex topic. He provides a conceptual definition of a system warranty and the various levels of such an agreement. The paper also discusses risk considerations in structuring warranties and how the program participants could benefit from such an integrated approach to warranties.

This paper is intended for publication and is presented in the publisher's format. Specifically, it has been double spaced and the length has been tailored to meet the publisher's desire. Subject to clearance, this manuscript will be submitted to Program Manager--Journal of the Defense Systems Management College for consideration.

The author wishes to extend his appreciation to Major Manuel T. Torres, Project Advisor, for his guidance and assistance in preparing this manuscript. The need for research on this topic was originated by the Air Force Business Research Management Center (AFBRMC), who sponsored the project. A special note of thanks goes to Captain Edward C. Mitchell who served as the AFBRMC project officer. Their cooperation and support were most helpful in conducting the research and in developing this manuscript.

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ABOUT THE AUTHOR

Major Thomas B. Miller, USAF, has had extensive experience in acquisition logistics and in developing system-level warranties. As the Deputy Program Manager for Logistics (DPML), he developed and negotiated the warranty for the T-46A trainer aircraft. He was also deeply involved in warranties for the C-17 aircraft and the F-109 engine. These experiences have given Major Miller an appreciation for program risk and the intricacies of developing an integrated acquisition strategy.

Major Miller's experiences include numerous assignments in acquisition and logistics. He has served as an aircraft maintenance officer and a logistics plans officer in the Strategic Air Command. During a two-year break in service, he designed and marketed solar heating systems. Upon return to active duty, he was assigned as a developmental engineer at the Air Force Acquisition Logistics Division. There he worked on numerous airlift and trainer systems, including the C-17, before being assigned as the T-46A DPML. Major Miller next served as the Aide to the Commander of the Ogden Air Logistics Center, then as the Chief of F-16 Program Integration for the F-16 System Program Manager.

Major Miller received his bachelor's degree in mechanical engineering from the United States Air Force Academy in 1972. He also earned a master's degree in business administration in 1979 from the University of Northern Colorado.

Major Miller's military education includes Squadron Officer School and Air Command and Staff College. He is also a graduate of the Defense Systems Management College, Program Manager's Course.

WARRANTIES AND ACQUISITION STRATEGIES

BUILDING CASTLES

An acquisition strategy is like the castle in which a program manager lives and operates.

Building castles is not a simple art, just as building acquisition strategies isn't simple. Putting together an acquisition strategy requires an understanding of the elements of program management and an appreciation of the risks of the overall program.

Risks bear heavily on the construction of both castles and acquisition strategies. In a castle, the draw bridge spans the moat into the real world beyond the castle walls. Like draw bridges, warranties extend the program's risks beyond delivery and into the operational real world. This article discusses warranties in this context by providing a conceptual definition of a system warranty and the various levels of such an agreement. It also addresses risk considerations in structuring warranties and how the program participants could benefit from such an integrated approach to warranties.

Understanding real world risks allows one to construct the most appropriate, integrated program strategy. Similarly, understanding the purpose of the castle and the threats from the real world allows it to be built for survival. But a castle without a draw bridge to span the moat would be useless.

In the same way, an acquisition program without a warranty would be useless; at least in the opinion of the U.S. Congress as expressed in the 1984 Department of Defense Appropriations Act (Public Law 98-212). Since that bill became law, warranties have become a way of life in the acquisition community. Not only did this law require material and workmanship to be warranted, but it also required performance guarantees. Some masterful jobs have been done in developing warranty concepts that are fully integrated into the program's overall strategy. The F-16 reliability improvement warranty program and the C-17 reliability and maintainability demonstrations are good examples. In other cases, "boiler plate" clauses have been inserted into contracts, providing coverage for latent defects only. "Boiler plate" is frequently copied directly from examples in regulations without tailoring to the specific program. This latter approach may be perfectly appropriate, or it may be woefully short sighted. In the words of a sage Defense Systems Management College (DSMC) professor, "It all depends."

A CONCEPTUAL DEFINITION

In designing warranties to extend programs into the risky world of operational use, one needs a clear concept of what a warranty means to a program. Program managers must understand what is meant by "warranty" and how it fits into their acquisition strategy. The Federal Acquisition Regulation (FAR) provides us with a starting point: "'Warranty,' as used in this subpart, means a promise or affirmation given by a contractor to the Government regarding the nature, usefullness, or condition of the supplies or performance of services furnished under the contract." (3:46-9)

This sounds fine, but sometimes it helps to clarify the FAR language with familiar words to insure understanding. In the author's opinion, an alternate definition of the warranty concept would read, "A warranty is a conditional agreement between the contractor and the government on what will be done if the system doesn't meet the performance requirements, after delivery."

This definition places greater responsibility on the program managers and the contractors early in the program. With it they must project their program into the real world, beyond the warranty draw bridge and into operational service. Since a warranty is a negotiated agreement between the contractor and the government, it is undoubtedly best shaped in a competitive environment before the production contract is signed. (5:25)

They must consider the possible spectrum of events and their potential timing when the warranty is created, and, equally important, when it is priced in the proposal. These considerations lead to a discussion of the "level of warranty" to be applied.

LEVEL OF WARRANTY

The program manager should consider the "level of warranty" from three perspectives. The first level to consider is the scope of the warranty; i.e., which deliverables are covered? It may be limited to the hardware but may also include related software, software support material, engineering drawings, technical orders, and other deliverable data. The first level of a warranty, the scope, needs to be explicitly defined in the contract's warranty provision. Since one purpose of a warranty is fostering quality products, this sends a clear message to the contractors telling them where to place their emphasis. (3:46-9)

The second warranty level, the period of coverage, must also be defined in the warranty. A specific period must be stated, either in terms of calendar days or a coverage period keyed to some particular program event or milestone, such as the completion of fatigue testing. The program managers must be sure to avoid a warranty expiring during the item's shelf life. They should carefully include any operational testing that may occur

after delivery of some of the items as was done in the case of the C-17, T-46A, and F-18. Both the C-17 and T-46A programs contained provisions for operational demonstrations of the system reliability and maintainability after delivery. (6:43) In the F-18 program, like many, aircraft were delivered prior to the completion of fatigue testing. Its warranty provided coverage when serious problems were found during this testing. (1:25)

The third level of warranty, the remedy or correction of the defect, must also be defined with particular emphasis on the government's options. These options may include repair, replacement, redesign, or other appropriate action to insure that the government gets what it paid for. Safeguarding these options allows the government to be able to accomplish the mission while the correction is being implemented. Fleetwide retrofit may be an option. Also, the FAR explicitly extends the required warranty coverage to include the usefulness of the design in cases where the government does not specify the actual design. Where it does, the warranty may extend only to materials and workmanship. (3:46-10) Cost implications for follow-on buys should also be specific, to the extent possible. No contractor can be expected to assume unlimited risks. The limits on their liabilities should be explicitly stated. For example, these limitations could be expressed as a maximum number of no cost spares they may be expected to provide, the maximum quantity of items to be retrofitted, or perhaps a monetary limit on their

total liability. (5:50) These limitations should be carefully considered relative to the price being asked for the warranty to insure the contractor's liability exceeds the price. This presents the contractors with some financial risk and motivates them to improve product performance. (5:50)

CONSIDERING RISKS

Developing a warranty within the constraints of these three levels must be done with a full appreciation of the program's risks. A 1977 ARINC Research Corporation report concluded that "... a warranty can be structured properly to share the risk between the contractor and the government. Further, such warranties provide a proper range of positive and negative incentives to insure achieving... objectives." (4:xvi) Both contractor and government risks in terms of cost, schedule, and technical performance must be considered. The ARINC report also pointed out, "The warranty provisions for a given application should be tailored expressly to the procurement at hand. Proper selection of provisions can greatly mitigate the risks to be encountered by both parties." (4:xvi) Techniques for analyzing program risks are taught at DSMC as part of the Program Manager's Course curriculum on contract type and incentives. (7:--) These techniques and underlying concepts should not be limited to selecting contract type and developing incentive arrangements;

they should also be used in assembling the entire acquisition strategy. "The key is to remember warranties or incentives are not ends in themselves, but merely features within the overall program. The warranty/incentive must complement other program features and provide a logical extension of the overall program objectives." (6:54) Each element of that strategy should reflect where the risks lie and how they are shared by the contractual parties. Additionally, as the program matures from the conceptual phase to full-scale development (FSD), and, finally production and deployment, the corresponding changes in risk are reflected in the acquisition strategy.

The same analysis techniques can be used to structure the appropriate warranty levels. As risks are evaluated and projected, an acquisition strategy is developed which should contain internally consistent levels of warranty. Allowing the warranty to evolve with the acquisition strategy will help keep contractor and government risks in proper proportion. An alternative approach would be simply slapping on a "boiler plate" warranty to meet the legal requirement. Not only would this show little concern for defects which may be discovered in the system after delivery, but such a disjointed acquisition strategy could result in unbalanced program risks, leading to increased costs. A process of careful risk evaluation and strategy development, tempered by planning for operational product performance, would provide a more coherent program and offer improved chances for

success. An appropriate, mutual sharing of risks would also help control the cost of the warranty itself.

For the warranty to be fully effective it needs to be developed early enough in the program to impact the product's final design. Leverage on contractor design decisions must occur early in the program, before designs are frozen. Since the FSD phase prepares designs for ultimate production, the warranty agreement needs to be entered into at the beginning of FSD. (5:34) Waiting to initiate a warranty agreement until the production contract negotiations would not allow the design to be affected by the warranty considerations. In effect, only materials and workmanship would be warranted at this late stage. However, some caution must be exercised in structuring a warranty that will be administered in the future.

The government bears a degree of risk in assuring itself the warranty can be administered. For example, a warranty could require parts tracking or performance monitoring which may be difficult or expensive for the administering agency. If the contractor recognizes such an unenforceable situation, the entire warranty may be ineffective despite the best intentions of the program manager. To avoid this hazard, the ultimate warranty administrators should be involved when the agreement is structured and negotiated.

WHO BENEFITS?

All participants in the acquisition process would benefit from this balanced approach to the development of warranties. The immediate beneficiary would be the program managers who develop the acquisition strategies. Every program manager strives to develop a strategy that is internally consistent, fair, and will meet the program's objectives. This can only be achieved with a totally integrated approach from initial concept development through delivery with an enforceable warranty.

Industry should also welcome this integrated warranty approach since it would provide a more precise definition of risks sharing early in the program. By explicitly stating the levels of warranty for each delivered item, the program manager provides a clearer picture of the risk sharing expected in the program. If effectively constructed, the warranty would tie the whole program together, as in the case of the C-17 program. It should make it easier for the contractors to accurately price the warranty because their cost estimates could be more exact.

Additionally, a properly written warranty would motivate the contractors to expend resources on product assurance early in the program while government funds are flowing into the effort. This would help them avoid expenditures to correct defects after delivery when government funding has stopped. Industry would be providing the government with good, high quality products that

do, in fact, meet the military's performance requirements--reputedly the defense industry's most important objective. (2:25)

The proposed approach would also be beneficial to acquisition program review authorities. It would be applicable to the numerous and varied programs they routinely review. These reviews are particularly important in terms of warranties, since the warranty extends the contractual relationship beyond the point in time of the item's delivery and acceptance. Today's acquisition process often finds several new program managers throughout a program's life. It then becomes incumbent on the program review authorities to insure one program manager's expedience doesn't become another program manager's dilemma.

SUMMARY

In today's acquisition environment, warranties have become a way of life. Each warranty must be carefully integrated into the respective acquisition strategy. To be effective, they need to be integrated into a program before it reaches the point of bending metal and putting hardware on the ramp. The program manager must insure that the overall acquisition strategy is integrated, cohesive, and meets the needs of the program and ultimately, the user. Risks must be fully considered and balanced. Each strategy must be adapted to fully account for

these risks with a warranty carefully integrated into the program. It must state the level of warranty, be applied at the right time, and insure an equitable sharing of risks. The result would be an integrated program strategy beneficial to all participants. The burden for this integration lies with the program managers. They must insure their program's success through an acquisition strategy with an integrated warranty; like a castle with a draw bridge, built on a solid foundation.

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